

22/10/2016

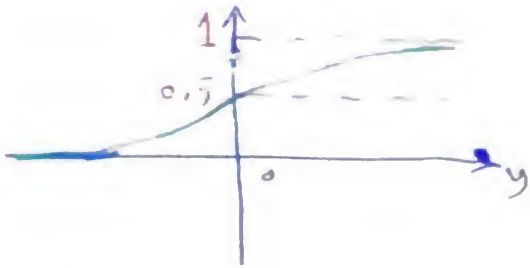
بیت

محمد

الکیمیاء [4]

Sigmoidal fn

$$S = \frac{1}{1 + e^{-y}}$$

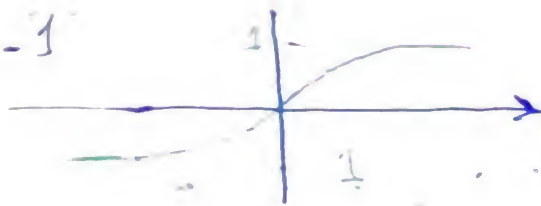


$$y = \ln \frac{S}{1-S}$$

Bipolar Sigmoidal fn

$$S = \frac{1}{1 + e^{-y}} - 1$$

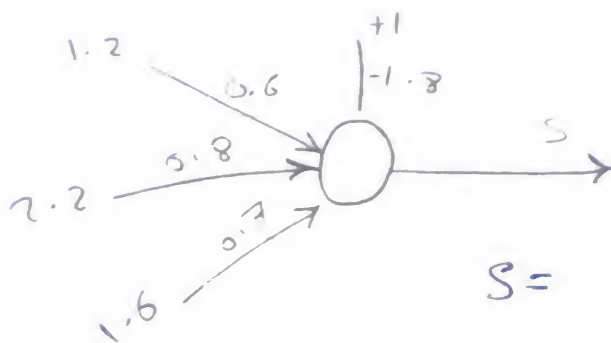
$$= \frac{1 - e^{-y}}{1 + e^{-y}}$$



$$y = \ln \left( \frac{1+S}{1-S} \right)$$

Sheet 2

[14]



$$y = 1.2 \times 0.6 + 2.2 \times 0.8 + 1.6 \times 0.7 - 1.8$$

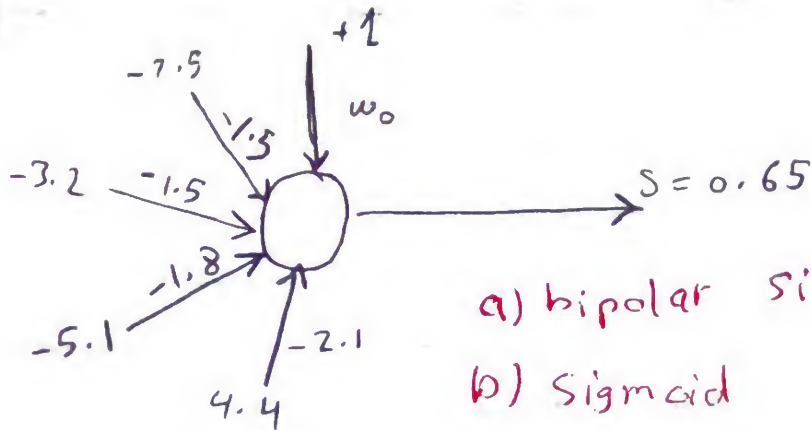
$$= 1.8$$

$$S = \frac{1 - e^{-y}}{1 + e^{-y}} = \frac{1 - e^{-1.8}}{1 + e^{-1.8}} = 0.716$$



[15]

15



a) bipolar sigmoid  
b) Sigmoid

a)  $y = -1.11 + w_0$

$$y = \ln \left( \frac{1+s}{1-s} \right) = \ln \left( \frac{1+0.65}{1-0.65} \right)$$

$$= 1.551$$

$$\Rightarrow w_0 = 1.551 + 1.11 = 2.661$$

b)  $y = -1.11 + w_0$

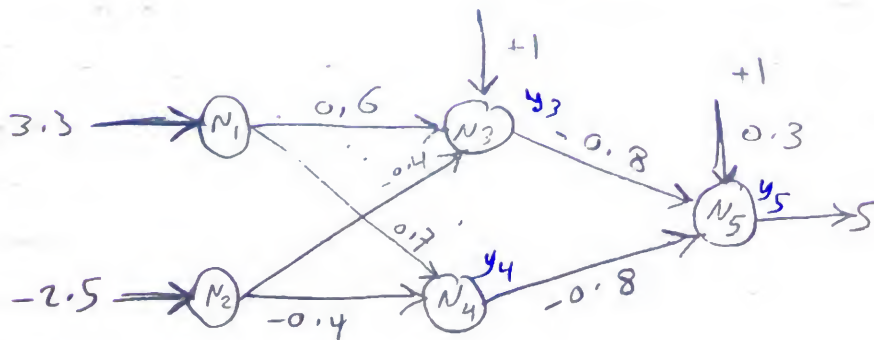
$$y = \ln \left( \frac{s}{1-s} \right) = \ln \left( \frac{0.65}{1-0.65} \right)$$

$$= 0.619$$

$$\Rightarrow w_0 = 0.619 + 1.11 = 1.729$$

16 نفس الموضوع مع 2 output neurons

17



$$y_3 = 0.6 \times 3.3 + 0.4 \times 2.5 + 0.5 = 3.48$$

$$y_4 = 0.7 \times 3.3 + 0.4 \times 2.5 - 0.2 = 3.11$$

2

$$f(y_3) = \frac{1}{1 + e^{-y_3}} = \frac{1}{1 + e^{-3.48}} = 0.97$$

$$f(y_4) = \frac{1}{1 + e^{-y_4}} = \frac{1}{1 + e^{-3.4}} = 0.957$$

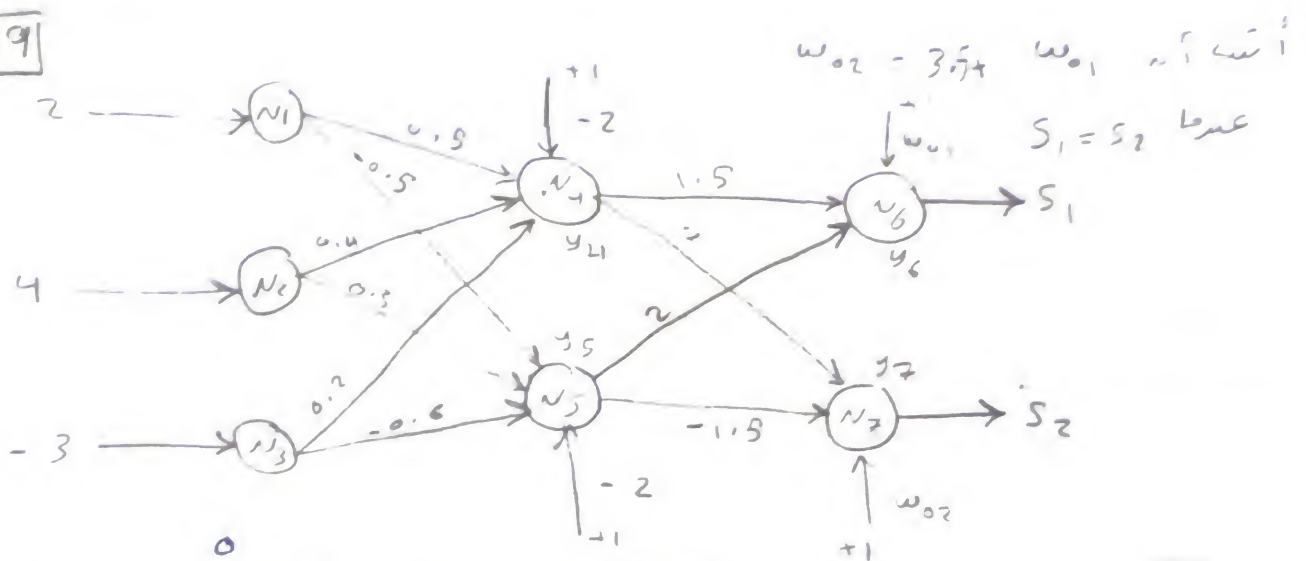
$$y_5 = 0.97 \times -0.8 + 0.957 \times -0.8 + 0.3$$

$$= -1.242$$

$$S = \frac{1}{1 + e^{-y_5}} = \frac{1}{1 + e^{1.242}} = 0.224$$

[18] Same as [17] but bipolar

[19]



$$y_4 = -3.201 ; y_5 = -4.935$$

$$f(y_4) = \frac{1}{1 + e^{-y_4}} = \frac{1}{1 + e^{3.201}} = 0.039 = 0.5$$

$$f(y_5) = \frac{1}{1 + e^{-y_5}} = \frac{1}{1 + e^{4.935}} = 0.007 = 0.5$$

$$y_6 = 1.75 + w_{01}$$

$$y_7 = -1.75 + w_{02}$$

$$S_1 = S_2 \Rightarrow \frac{1}{1 + e^{-1.75 - w_{01}}} = \frac{1}{1 + e^{-1.75 - w_{02}}}$$

$$e^{1.75 - w_{01}} = e^{1.75 - w_{02}}$$

$$-1.75 - w_{01} = 1.75 - w_{02}$$

$$\Rightarrow w_{02} = w_{01} + 3.5$$

[20]  $\rightarrow$  مكررة (sigmoidal)  $S = 0.3$

[21] get  $w_0$  at  $S = -0.3$

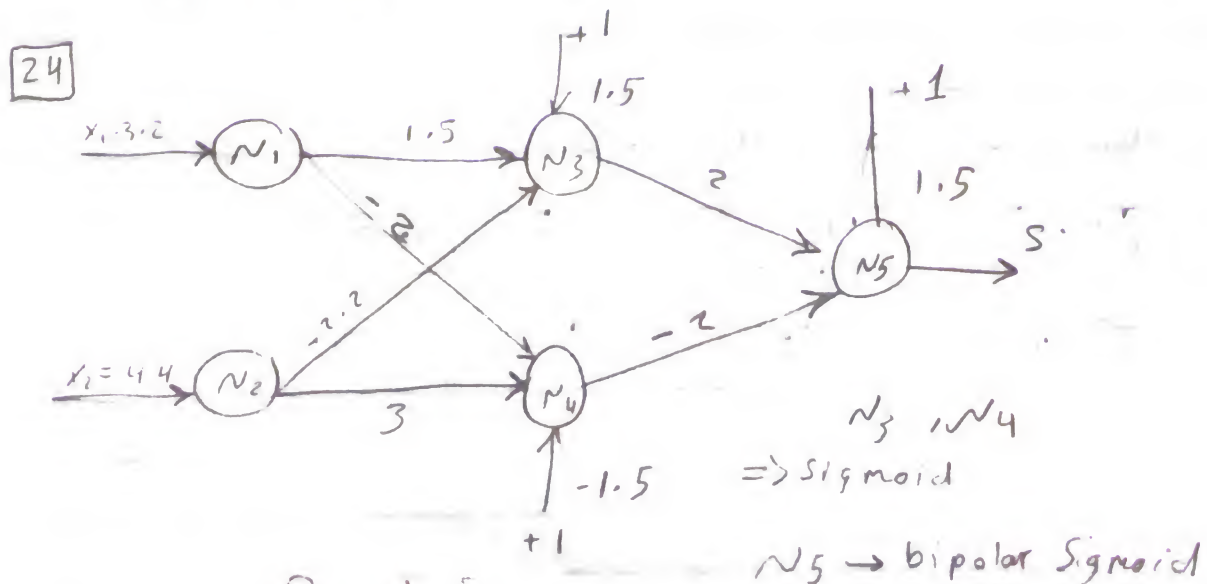
cannot be solved since sigmoidal output

$$0 < \text{output} \leq 1$$

[22] مكررة وليست

[23] من الليونات  $S = -1.5$

ليست لها من  $[-1, 1]$  الدالة مصورة



find S

$$y_3 = (-2.2)(4.4) + (1.5)(3.1) + 1.5 = -3.38$$

$$y_4 = (-2)(3.7) + (3)(4.4) + 1.5 = 5.3$$

$$f(y_3) = \frac{1}{1 + e^{3.38}} = 0.033$$

$$f(y_4) = \frac{1}{1 + e^{-5.3}} = 0.995$$

$$y_5 = 0.033 \times 2 + 1.5 + 0.995 \times ~~4~~ - 2 = 0.561$$

$$S = \frac{1 + e^{0.561}}{1 + e^{-0.561}} = 0.273$$